
Space Weather Forecast

Issued on Saturday, 04 May 2024 at 01:33 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Further Moderate-class flares likely with a chance of Strong flares through the period. Minor-Moderate Geomagnetic storm conditions are likely in the coming days with a chance of Strong storm intervals.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at High levels, due to a strong flare at 03/0222 UTC from an active region in the north-centre disc, which also produced a number of other Moderate flares. A region in the southeast has also been active, producing two Moderate flares in the past 24 hours. Another Moderate flare was observed from a region beyond the southwest limb late in the period. There are currently nine sunspot regions on the visible disc. Of these the two aforementioned regions, both with a complex magnetic structure, are the most at active regions on the disc. A region in the northeast developed rapidly. The remaining sunspot groups are much smaller and appear more magnetically simple.

There are potentially two Earth-directed Coronal Mass Ejections (CMEs) during the period. A CME associated with the Strong flare at 03/0222 UTC has been analysed and may interact with Earth in the middle of day 2 (05 May). A filament (arc of Sun's material and plasma) eruption starting around 03/2000 UTC in the northeast resulted in a fairly wide coronal dimming in coronagraph imagery. Indications are a CME has resulted given there was an associated Type II Radio Emission, however a temporary delay in solar imagery availability means that there is a slight delay in assessing the event.

Solar Wind / Geomagnetic Activity: Solar winds increased from slightly elevated to elevated levels early in the period, peaking 536 km/s at 03/0418 UTC. Speeds have since steadily declined to near background levels around 380-400km/s. The Interplanetary Magnetic Field, Bt, started at moderate levels, then fell back to weak levels from 03/0145UTC. The important north-south component, Bz, was moderate and variable at first, before varying weakly from around 03/0200 UTC. Resultant Geomagnetic activity was Quiet to Active (Kp1-4).

Energetic Particles / Solar Radiation: Solar radiation was at normal background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High solar activity is forecast to continue with further Moderate-flares expected and a chance of isolated Strong flares, principally from the large sunspot regions located in the north-centre and southeast disc.

Solar Wind / Geomagnetic Activity: Two Earth-directed CMEs currently feature in the forecast period. The first most likely arriving late on day 1 (04 May) or early day 2 (05 May) and the second expected at Earth mid day 2 (05 May). A potential third CME that left the sun late 03 May is awaiting analysis.

Initial normal background solar winds are expected to increase on day 1 (04 May) due to the influence of a large coronal hole. Speeds should become slightly elevated to elevated between days 1 and 3 (04-06 May). A second coronal hole enhancement is expected on days 3 and 4 (06

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and 07 May), with speeds likely peaking at elevated to strong levels before starting to decline on day 4 (07 May).

Combining effects from the various CMEs and coronal hole influences through the period results in a lower than average Geomagnetic forecast confidence.

Geomagnetic activity although initially Quiet, is expected to increase on day 1 (05 May), becoming Active to G1/Minor Storm by the end of the day with a chance of G2/Moderate to G3/Strong Storm conditions. Conditions will most likely average out at G1/Minor to G2/Moderate Storm levels on day 2 (06 May) with a chance of isolated G3/Strong Geomagnetic Storm intervals. Activity should generally subside into day 3 (06 May), though should predominantly remain between Unsettled and G1/Minor Storm levels, again with a chance of isolated G3/Strong Geomagnetic Storm intervals. By day 4 (07 May), Quiet to Unsettled conditions are most likely, but still with a chance of G1/Minor Storm conditions persisting for a time and also dependent on the analysis of the anticipated CME from late 03 May.

Energetic Particles / Solar Radiation: Solar radiation levels is most likely to remain at background levels through the period. There is a slight chance for an S1/Minor Storm or greater event occurring days 1 and 2 (04 and 05 May), increasing to a chance days 3 and 4 (06 and 07 May), should any proton-rich flares occur, primarily from the large, complex sunspot region in the north-centre disc.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	80	90	70	30
Strong	G3	No	30	40	20	5
Severe	G4	No	5	10	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	Yes	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	15	15	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)